

Weekly Report for 11/30/2015

Highlights

- With H. Shang set up software, database and studies to create step-less orbit steering for ID, BM and Canted Undulator. Presented result to orbit stability working group.(Nov+Dec.) (Louis Emery)

APS Renewal and Upgrade

- Work on upgrade lattice design of lower emittance. (Yipeng Sun)
- Work on upgrade lattice design with high betax injection region. (Yipeng Sun)
- Continued work on the longitudinal "impedance budget" idea for the upgrade. (Ryan Lindberg)
- Participated in Decker's telephone conference with Dimitryi Teytelman about longitudinal feedback systems.(Nov) (Louis Emery)
- Made slides on the subject of magnetic measurement data. (Nov.) (Louis Emery)
- Merged B. Soliday's latest improvements to FASTION with mine. Simulation that originally took three weeks is now down to 19 hours. (Joe Calvey)
- Running newer, faster FASTION code for millions of turns in PAR cycle. Studying beam size blowup with charge, beam shaking, and simulations with more macroparticles. (Joe Calvey)
- Organized a meeting with CY Yao, K. Harkay, and R. Lindberg to discuss how to connect PAR beam size/booster efficiency measurements with elegant simulations of the booster. Decided that we should remeasure the efficiency now that the booster bunch cleaning stripline has been removed. (Joe Calvey)
- Working with COSMOTEC and Xiang to complete final simulation and optimization of HV feedthrough and Air-side connector design. (Chih-Yuan Yao)
- Investigate 1Hz injector mode related booster ramp problem with Ju and Tony. (Chih-Yuan Yao)
- Work with Argonne Physics to finalizing fast kicker design and simulation model. (Chih-Yuan Yao)

MCR Operations

Storage Ring Operations

- Investigated orbit errors and beam motion (Karen Schroeder)
- Assisted with recovery of IEX. User could not control it and Emery had us steer to the center of BPLD limits to lessen the possibility of a beam dump if there was any unexpected changes in power supplies. Once control was re-established we restored the steering back to User values. (Karen Schroeder)
- Looked into a problem that 1-ID personnel noted with being able to produce preset plots for the upstream device. Soliday found that the preset plots had a filter which required the downstream device "gap" to be below a certain value to display the data. At the present time, if 1-ID is using the upstream device, the downstream device must be fully open. I produced the plots 1-ID was looking for from our normal dataloggers and explained to them how they could get the information themselves from the PVs listed. Bob will update the preset plots at a later time. (Karen Schroeder)
- Assisted Emery with showing the MOR the new steering. Provided feedback on a few minor things to change and gave further information to ACOs/Operators. (Karen Schroeder)
- Assisted MCR with turning beam over to Users (Karen Schroeder)

- Found cause of beam dump 10/28: corrector S40BV4. Found cause of beam dump 11/4: corrector S10BV1. (Oct and Nov.) (Louis Emery)
- Investigated x-emittance growth during operation from home. The problem turned out to be x-chromaticity, while I initially thought it was S36C4 cavity from recent experience (oh well). (Oct.) (Louis Emery)
- Determined source of orbit change in MPS beam dump using FPGA bpms and response matrix. Found candidate S10A:H2 or S10A:Q2. It turns out that S10A:Q3 had the glitch through 100 Hz monitoring.(Nov.) (Louis Emery)
- Wrote detailed information about top-up process and operations during hybrid mode in Oct. for sector 7.(Nov) (Louis Emery)
- Investigated the loss of injection efficiency while it was occurring. Found no obvious cause while the injection rate recovered. (Nov.) (Louis Emery)
- Investigated higher than normal 100 HZ BW orbit noise. did not find origin. Suggested a cron job to take BW data on a regular time basis. (Dec.) (Louis Emery)
- Investigated and tested SR MXA and NASA tune measurement systems with Hairong. (Chih-Yuan Yao)

Linac Operations

- L2:WS1 water station water flow alarms have been an issue. After requesting water filter replacement the flow has since stabilized and alarm have dissipated. (Stan Pasky)
- Working with M. Hahne (ASD-DIA), made access into the linac tunnel; realigned laser through the transport line and reset the sample beam on the EM3 monitor. (Jeff Dooling)
- With beam cleanly through the transport line was able to test using a tilted lens for astigmatism correction of the beam. Unfortunately, this did not work. (Jeff Dooling)
- Will next look at using cylindrical lenses for the correction. (Jeff Dooling)

Procedures

- Reviewed updated procedures (Karen Schroeder)
- Updated Top-up Configuration Control procedure with personnel changes (Karen Schroeder)
- Provided Borland with the original files from the policy for coupling adjustment to preserve beam. Reviewed the proposed changes and provided comment. (Karen Schroeder)

MCR Operations administrative/misc.

- Produced downtime reports and either presented myself and gave to Flood for presentation to OPS Directorate (Karen Schroeder)
- Led daily 4 o'clock MCR meetings. (Karen Schroeder)
- Produced Run 2015-2 operations schedule for approval at OPS Directorate. (Karen Schroeder)
- Reviewed and approved non-RSS SR work requests for ongoing work and shutdown. (Karen Schroeder)

APS Machine Studies

Storage Ring Studies

- Work on APS optics design with integration of helical superconducting undulators, with updated HSCU device length of 1.6m, centered at 1.6m from ID32 center. (Yipeng Sun)
- Performed gap scans to update ID Gap feedforward tables (Karen Schroeder)
- Reviewed the studies schedule and notified Users and UES of any studies requiring shutter permit. (Karen Schroeder)
- Produced the beam-related portion of the studies schedule one week due to unavailability or scheduler. (Karen Schroeder)
- Did a quick check to see how much time would be saved if all gaps could be closed at the same time instead of staggering to determine if this could save a significant amount of time for MOMBO scans. The net savings was about two minutes per scan. It was decided that this was not enough to warrant a change in how we close the gaps for gap scans. (Karen Schroeder)
- With H. Shang set up software, database and studies to create step-less orbit steering for ID, BM and Canted Undulator. Presented result to orbit stability working group.(Nov+Dec.) (Louis Emery)
- Write GUI for angle bum local impedance measurement. Result await the following week. (Dec.) (Louis Emery)
- Conducted an abort kicker study with K. Harkay. Using the fast BLMS we were able to identify a delay and voltage where the abort kicker could function protecting the SCUs while not tripping rf cavity arc detectors. (Jeff Dooling)
- Presented these results at the studies meeting. (Jeff Dooling)

Booster Studies

- Tested a timing configuration for acquiring current and voltage waveform during non-ramp half of the 1Hz mode with help from Frank. (Chih-Yuan Yao)

APS Machine Research and Development

Storage Ring Research and Development

- Discussed with Mohan possible ID canting in ID2 using a electromagnet. There would be no bpm since we don't do steering.(Nov.) (Louis Emery)

Booster Research and Development

- Discussed recent experimental studies of the booster efficiency, and whether the observations fit my simulations. So far the jury is still out, although we at least have identified future areas to focus on. (Ryan Lindberg)

Linac Research and Development

- Supported PCGun studies as to assist with injector setup and beam transport as well as setup for Interleaving. (Stan Pasky)
- Interleaving task - (Stan Pasky)
- 1) Prepare and test fast switching of K1 to the load and from the load. (Stan Pasky)

- 2) Made two trigger option for K1, each with its own time delay, and automate switching from one to another in a short time. (Stan Pasky)
- 3) Made it possible to stop pulsing K3 and turn off the laser pulse when PCgun is not used during the the same time as for switching of K1 (Stan Pasky)
- 4) Use a Hall probe to find out if the trims of the alpha magnets can be used to buck the alpha magnet remnant field, and if so, determine the currents needed for the trim magnets; (Stan Pasky)
- Began running ASTRA simulations to look for an alternative solution to PC/TC gun interleaving; specifically a "one-gun, two-laser" approach which would not require switching the alpha magnet on and off. (Jeff Dooling)

APS Machine Software

Storage Ring

- added useFreePathMatrix option to makeLocalSteeringMatrices to use the free path length matrix as reference matrix; And regenerated local steering matrices for BM and CU steering to use free path length matrix. (Hairong Shang)
- spent most of time in improving new steering methods for SR ID, BM and CU steering and tested with Louis, installed them to OAGapps. Plan to put into operation this Wednesday. (Hairong Shang)
- Attended meeting with Controls on how to reduce CA connection errors with BSP-100 bpms.(Nov.) (Louis Emery)

Injectors

- removed loading ramp before verifying and removed plot of raw current waveform in verifying ramps. (Hairong Shang)
- modified tGetBooRampCurrWF o use It:Bs:StartRamp2BsIp.VAL to obtain the booster injection time. (Hairong Shang)

Simulation Software

- Verified some shower simulation segmentation fault found by Dooling. Had Soliday fix this. (Oct) (Louis Emery)

Meetings, workshops, conferences, committees, LMS related, and reviews

- Attend the December/January maintenance scheduling meeting. As a result some big project will be taking place in the Linac. L2:AS1 accelerating structure will be replace and will require rf conditioning prior to the next run. (Stan Pasky)
- Tentatively we will close the linac tunnel (beam permit) on 01/12/2016 at 15:00 and take the normal start up approach (ACIS Shutdown Validation) for the L2 linac modulator and rf system. (RF Group Support Required) (Stan Pasky)
- L2:AS1 and waveguide components will be rf conditioned at 30pps rep rate. A check list has been created as a reminder and guide for conditioning. (Stan Pasky)
- Reviewed one paper for Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment . (Yipeng Sun)
- Reviewed a paper for Physics of Plasmas (Ryan Lindberg)

- Attended shutdown planning meeting (Karen Schroeder)
- Attended Beam Stability Working Group meeting (Karen Schroeder)
- Attended machine studies meetings (Karen Schroeder)
- Review panel for HEP accelerators. Huge amount of work. (Nov) (Louis Emery)
- Registered, organized travel, and submitted abstract for TWIICE-2 conference. (Joe Calvey)
- Submitted two abstracts to IPAC15. (Joe Calvey)

Education, Mentoring and outreach

- Attended workshop for postdocs on making use of the mentoring program. (Joe Calvey)

LCLS

- Contributed to the email scientific debate between ANL/SLAC scientists and DESY colleagues regarding the interpretation of a recent Delta undulator experiment, and how one should analyze undulator radiation from an off-axis, displaced electron beam. So far, the DESY team remains resolute although I still think that they are wrong... (Ryan Lindberg)

Safety and Required Training

- Completed - (Stan Pasky)
- LMSPROC137 REQUIRED READING - Release of Materials and Equipment (Stan Pasky)
- View my JHQ (Stan Pasky)
- Finished one training course. (Yipeng Sun)
- Completed EM116 (Ryan Lindberg)
- Successfully completed Emergency Management and Continuity General Awareness & Price-Anderson Amendments Act (PAAA) Program (Karen Schroeder)

Miscellaneous

- Hosted APS colloquium speaker Laura Greene, which involved organizing her meeting schedule with ANL scientists, dinner, lunch, and driving her around a bit to make some meetings. (Ryan Lindberg)
- Provided John Maclean with shutdown dates which were not published on the long-range schedule yet. (Karen Schroeder)
- Running ion simulations for NSLS-II using SLAC code. Investigating the possibility of ion instability at full current (500 mA). (Joe Calvey)
- Took a day of AL on Friday (Jeff Dooling)